Expediting Clinician Adoption of Safety Practices: The UCSF Venous Access Patient Safety Interdisciplinary Education Project

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Abstract

Objectives: The primary objective of the University of California, San Francisco (UCSF) Venous Access Device (VAD) Patient Safety Interdisciplinary Education Project was to develop a 30-hour/one clinical academic unit VAD patient safety course with the aim of expediting clinician adoption of critical concepts related to VAD-related patient safety. This paper describes the evolution of the interdisciplinary academic and continuing education courseware, and discusses the theoretical and technological underpinnings of the work. **Methods:** Following development of the academic course, the demand for derivative short versions was identified by clinician users and administrators based on evidence of (1) patient safety threats, such as air embolism associated with central line removal; (2) VAD competency deficits; and (3) wide variation in learner characteristics and needs. **Results:** Consideration for differing learning needs and time constraints of practicing clinicians led to the production of short versions of the core course, focusing on high-risk concepts related to VAD patient safety. Web-based courses using multiple media content presentation methodologies and addressing learner preferences are expected to facilitate learning, retention and transfer of the knowledge into practice. **Conclusions:** While the summative project evaluation is currently in progress, formative evaluation suggests the courseware is highly linked to key patient safety concerns related to VADs and that the core course, as well as the derivative short version of the content, may be institutionalized as a source of multidisciplinary clinical competency development, orientation, and training.

Introduction

The UCSF Interdisciplinary Venous Access Safety Education Project, launched in 2001, is grounded in the influential report of the Council on Graduate Medical Education and the National Nursing Council on Nurse Education and Practice, *Collaborative Education to Ensure Patient Safety*.[1] Intended to synthesize and package instructional courseware to expedite the interdisciplinary practitioner transfer of critical patient safety concepts related to venous access devices (VADs) into practice, the development effort was undertaken within the context of contemporary health care delivery and professional practice. Several key factors influenced the demand for the program and informed the instructional development process:

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- Widespread restructuring of patient care delivery systems, evolving over nearly 2 decades.[2–9]
- Growth in America's aging population and improved disease management in chronic illness populations, resulting in markedly more complex, severely ill hospitalized patient populations.[2, 10]
- Consensus of consumers, policymakers, and the media that the health care system exposes patients to iatrogenic risks, errors, omissions, and complications that lead to unnecessary suffering and complications, prolonged recovery, extraordinary costs, and 44,000 to 98,000 unnecessary deaths per year.[3, 10–12]
- Association of VAD-related patient safety with nurse staffing and, in particular, the use of float/agency/temporary staff. This association highlights the special challenges facing multidisciplinary staff, as they attempt to form crucial collaborative relationships with temporary staff.[13–16]
- Primary use of peripheral and central line venous access devices (VADs) across the continuum of contemporary health care. More than 25 million hospital patients across the United States receive peripheral intravenous catheters annually, and an estimated 7 million central venous catheters (CVCs) are inserted each year.[17, 18]

The use of VADs spans all age groups from the preterm infant to the frail elderly and extends to almost any setting from the hospital to home, including ambulatory clinics, physicians' offices, and long-term care facilities. While these devices are essential to medical management and the delivery of lifesaving treatments, they are also a major contributor to morbidity and mortality, posing a threat to patient care quality, safety, and outcomes.

The VAD threat to patient safety

Overall complication rates associated with VAD catheter placement have been estimated at more than 10 percent.[19] Catheter-related bloodstream infection (CRBSI) and thrombotic events are the major complications occurring in the post-insertion period of use. Approximately 10 percent of hospital-acquired nosocomial infections are bloodstream infections, of which 70 percent are attributed to the use of a VAD.[20] As many as 350,000 patients acquire these life-threatening infections each year,[20] and it may be argued that VAD-related complications represent billions of dollars in health care expenditures and untold suffering for patients and their families.

The insertion, care, and management of VADs across the continuum of care are multidisciplinary and interdisciplinary responsibilities. The safe use of VADs requires training, supervision, and meticulous caution, or life-threatening complications can result.

Hospital reorganization and restructuring efforts, in response to regulatory and marketplace imperatives, have included redesigned inpatient care services

resulting in reduced nurse-to-patient ratios, increased demands on direct care nurses related to the decentralization of ancillary services, and a loss of mediating middle management and buffering clinical support services.[21–24] Concurrently, a sustained nursing shortage due to an aging workforce, low RN morale, reduced enrollments in basic and postbasic nursing programs, academic capacity, access limitations, and unprecedented employer demand threatens the ability of hospitals to provide adequate nursing staff to ensure patient safety and quality care.[25, 26] Data suggest that there are unprecedented numbers of temporary nurses filling vacant RN positions in acute care settings, further complicating the tradition of house staff rotations and annual turnover in academic medical centers.

Clinical workforce issues also add to the sense of VAD patient safety urgency, given the results of the Food and Drug Administration's (FDA) seminal Device Experience Network survey. The findings suggest that 52–73 percent of reported VAD complications have a cause-effect relationship associated with practitioner technique.[27] In response to these findings, the FDA convened the Central Venous Catheter Working Group (CVC–WG) to assess the problem and provide direction for public health action.[19] The primary goal of the group was to increase the awareness of VAD-associated complications and to educate practitioners in the appropriate use and management of these devices. The major effort of the group work was the development of an interdisciplinary educational video series, Central Venous Catheter Complications. Now is an opportune time to build on this early VAD-related interdisciplinary education effort.

Preventative strategies to minimize VAD complications have generally focused on technological advancement and interdisciplinary education and training. The Study of the Efficacy of Nosocomial Infection Control (SENIC), published in 1985, showed that both structure (expertise) and process (surveillance, feedback, and protocols) predicted lower infection rates.[28] The Center for Disease Control's (CDC) *Guidelines for the Prevention of Intravenous-Device-Related Infections* recommends systematic training repeatedly.[29] Despite the strength of these recommendations, however, a survey examining organizational policies regarding the insertion and care of CVCs indicated that only 56 percent of the acute care institutions surveyed conduct ongoing education regarding VADs, while only 19 percent designate trained personnel for the insertion and management of VADs.[30] It has been suggested that adoption of these authoritative CDC recommendations may hinge on evidence demonstrating the effectiveness of interdisciplinary education in preventing CRBSI and improving patient outcomes.

Cochran et al., examined the impact of an intravenous surveillance and education program (IVSP) on the reduction of CRBSI in a university teaching hospital.[32] Nurse educators performed surveillance, developed hospital procedures, and conducted educational offerings related to VADs. The IVSP resulted in neither a reduction in the total CRBSI rate, nor a reduction in the proportion of potentially preventable CRBSI. The authors suggested that the cost benefits and patient outcomes associated with those VAD teams whose staff

directly perform VAD care, as distinct from staff that focus on surveillance and education of direct care staff, merit evaluation.

Collaboration and institutionalization of multidisciplinary prevention strategies may have a substantial effect on the rate of VAD complications. In a prospective cohort study, Eggimann et al[31] implemented a multimodal, multidisciplinary prevention strategy designed to decrease the incidence of Intensive Care Unit (ICU)-acquired CVC infections. Multiple changes in protocols, together with an educational campaign, reduced infections from 11.3 episodes to 3.8 episodes per 1,000 patient days.

VAD education in academic health professions education

Evidence suggests that prelicensure nursing and medical education programs provide little or no instruction on intravenous therapy, even though the care and management of these devices are one of the most frequently required clinical skills. A 1988 survey of U.S. college associate degree nursing programs indicated that 42 of 158 (27 percent) responding schools did not provide instruction in venipuncture skills.[33] Moreover, post-licensure VAD procedure instruction for physicians-in-training and graduate nurses is nonstandardized. The typical graduate nurse and physician have learned VAD clinical techniques and processes of care from clinical preceptors, thus their knowledge and competencies may vary widely.

Conversely, there is compelling data to indicate that specialized education lowers the risk of complications associated with VADs. Ely et al.[34] conducted an institutional survey to determine physician and nursing awareness of CVC complication prevention and management. The survey detected a poor awareness of venous air embolism (VAE) as a potentially fatal complication associated with CVCs. Awareness of VAE and its prevention did not correlate with the level of physician training or experience. The findings led to the creation of a multidisciplinary educational program specifically for incoming house officers. The program improved VAE awareness, but the authors noted that the effect declined rapidly. A more intensive and periodic hands-on educational program may be needed—in addition to reinforcement through enhanced supervision of CVC insertion and removal practices—to achieve a more sustained improvement.

A review of the literature supports the notion that specialized training of all personnel involved with the insertion, care, and maintenance of vascular catheters may be one of the most important strategies for reducing VAD complications.[35] We argue, however, that education alone will not ensure VAD-related patient safety. Optimal patient safety demands an organizational culture built around a process of care, focused collaboration, and institutionalized systems that support and sustain VAD-related clinician competencies despite workforce turnover. We further contend that VAD-related education may be most effective if it is aligned with clinical role demands and relevant competencies. Only a few physicians may insert central lines, but more may remove them. The most effective learning also might be iterative, building systematically on prior learning and evolving clinical expertise, clinical settings, and patient populations.

Methods

Venous access device patient safety: an overview of the core course development

In developing the UCSF VAD Interdisciplinary Patient Safety Education Program, the universe of core concepts related to venous access device patient safety was synthesized from the scientific literature, authoritative reports and guidelines, and expert opinions. It was further shaped by real-time clinical patient safety issues that emerged from two large academic medical centers in California. A preliminary and comprehensive course blueprint was developed and reviewed extensively before undergoing further refinement through the use of feedback from a multidisciplinary group of expert practitioners. The resulting content was clustered into eight VAD Safety Core Course modules:

1. VAD Safety—Overview
2. Venous Access Anatomy and Physiology
3. Selection of Venous Access Devices
4. Insertion of VADs
5. Care and Maintenance of VADs
6. Diagnosing and Managing VAD Complications
7. Improving VAD Patient Safety through Patient Education
8. Continuous Quality Improvement—Strategies for Improving VAD Patient Safety Outcomes.

The systematic instructional design process, guided by a seasoned instructional technologist in the health sciences, was founded on several key assumptions:

1. The course would be evidence-based to the extent possible, and would integrate expert opinion to resolve questions emerging from gaps in the evidence.
2. The courseware would reflect an interdisciplinary approach, actively engaging the interdisciplinary professional and adult learners to move through mediated learning activities with a clinical application focus and a didactic dialogue style.
3. The course would be highly self-directed and Web-based; it would optimize and individualize learner options and preferences; and it would recognize wide variations in prior learning, experiences, and expertise.

The courseware format was designed to be consistent between modules and includes sections for learning objectives and learning plans. Learning plan sections vary by topic, but always include primary course materials (i.e., links to animated PowerPoint® files), external sources for material other than bibliographic references pertinent to module objectives, agency Web sites

involved in establishing guidelines for practice, assignments for independent interdisciplinary practice/learning opportunities, and bibliographic reference lists for traditional and online reference materials. Each module concludes with a multiple choice, self-assessment quiz. Originally, all educational materials were placed into PowerPoint® and Word® document files for posting in WebCT®, the content management system (CMS) used by the University of California, San Francisco. An initial file functionality review led to a change in file formats, from Word-based to HTML-based documents. Linkages and the user interface were improved. Constraints acknowledged by the VAD team included practitioner time limitations, as well as those of the CMS, browser capabilities, users' computer system hardware and software limitations, Internet connection speeds, file types, and file sizes.

The resulting VAD Safety Core Course is a 30-hour course and may require more time, based on learner pacing and Web-based education sophistication. While comprehensive, and perhaps even groundbreaking in its scope, feedback from target multidisciplinary learners revealed that the ultimate effectiveness and utility of the VAD Safety Core Course was compromised by its length, concept density, and expectation for student commitment. We also discovered that Web-based VAD education would need the capacity to animate and illustrate concepts, if we were to maximize learning.

Linking instructional technology with an "evidence base"

> *"What we are beginning to note most about e-learning is its growing diversity, beyond courseware and instruction, to generating and disseminating information and directly supporting performance." — MJ Rosenberg* [36]

Evidence-based practice integrates the explicit use of current best evidence with clinical judgment, expertise, and patient preferences to make decisions about the care of individual patients.[37] Two influential Institute of Medicine reports, *To Err Is Human*[10] and *Crossing the Quality Chasm,*[38] galvanized awareness among the health professions of the need to expedite the uptake of evidence to ensure that clinical practices are aligned with science. In the face of exploding knowledge and rapid cycle information dissemination, practitioners are challenged in their quest to identify, synthesize, and interpret emerging new knowledge and then translate it systematically into practice. The American Academy of Family Physicians, highlighting the potential contribution of technology, suggested that traditional approaches to fostering the adoption of new knowledge need to be replaced with new modes of practice-based learning and improvements that include team performance, sharing of authority, nonpunitive critique, conflict resolution, and the use of new learning experiences for practice improvement.[39] The assumption that technology is a tool and strategy of evidence-based practice, and should be used to expedite positive outcomes for patients and for learners, served as a foundation for the UCSF VAD Interdisciplinary Education team's work.

Leveraging technology to optimize venous access education

The UCSF VAD Patient Safety Interdisciplinary Education WebCT 30-hour core course was designed as an elective course for graduate students in the health professions. It was offered initially to students and clinicians within the UCSF Schools of Nursing and Medicine, in the fall of 2002. Seminar sessions were included in the first core course offering, to augment the basic online content with lecture and discussion while providing an opportunity for formative evaluation. When the core course was repeated the following academic quarter, the classroom seminar component was eliminated (though faculty contact was available to all students via e-mail), to better evaluate the prospect of offering the course entirely online.

As course evaluations were analyzed and information about the course was disseminated in medical and nursing meetings and at interdisciplinary group presentations (which included attending physicians, quality professionals, and academic/clinical administrators), feedback led the project team to reassess the needs of target learners and patient safety stakeholders.[40] The steps in this assessment process included identification of (1) urgent VAD safety factors identified in guidelines established by subject matter experts, (2) distinctions between VAD safety content that was "urgent" and that deemed "nice to know" by subject matter specialists, (3) the interplay between theoretical and applied knowledge in VAD clinical applications, and (4) learning styles or strategies specific to each group that warranted project revision considerations. With feedback affirming the demand for versions of the course geared to postlicensure clinicians, the project team advanced the development of derivative educational products that were distilled from the core course and strategically aligned with consensually validated organizational and clinical priorities for VAD safety improvements, competencies, and outcomes.

Web-based courseware development and learner characteristics

Informed by core course student evaluations, expert reviews, and stakeholder feedback, it was clear to the VAD Interdisciplinary Patient Safety Education team that abbreviated, competency-driven versions of the 30-hour, all-inclusive VAD core course were needed, with an emphasis on high risk mortality/morbidity issues (e.g., prevention of air embolism during CVC removal). The effectiveness of the courseware was further enhanced by the addition of short graphic animations with appropriate labeling and narrations depicting critical concepts and processes involved in catheter placement and removal. The animations also simulated pathophysiological responses to complications associated with catheter misplacement or misuse, visually reinforcing information from the text. Narrated streaming video demonstrations of procedures affecting patient safety, such as VAD removal, also were added to appeal to differences in the learning styles and learning preferences of the target groups.

Content specific to central venous catheter removal was developed using feedback from clinicians internal and external to UCSF. Physicians, house staff, and direct care and advanced practice nurses were regarded as the target audiences for this content, based on the consensus that these groups have the greatest impact upon CVC patient safety during line removal.

Discussion of key concepts and instructional dilemmas with clinical practitioners was ongoing throughout the developmental process. Literature reviews related to learning styles and strategies, learning preferences, and continuing education needs supported the course evaluation feedback and contributed to decisions regarding the module content and delivery. The goal of the clinician-focused instructional development process was to facilitate clinician retention and the application of a defined body of knowledge (i.e., VAD patient safety issues), while producing a behavioral change (i.e., improved VAD practices). This goal is congruent with the general view of self-directed or independent learning—a common online instructional strategy[41, 42]—as well as evidence-based practice. Moreover, leveraged technology capitalizes on the capacity of Web-based education to expedite revolutionary changes in clinical behaviors and practice, a goal highlighted in the recommendations of the Council on Graduate Medical Education and the National Nursing Council on Nurse Education and Practice, in their 2000 report, *Collaborative Education to Ensure Patient Safety*.[1]

Optimizing self-directed learning and continuing education

Self-directed learning is defined as "a process in which individuals take the initiative, with or without the help of others, in (1) diagnosing their learning needs, (2) formulating learning goals, (3) identifying human and material resources for learning, (4) choosing and implementing appropriate learning strategies, and (5) evaluating learning outcomes."[43] Though self-directed learning is grounded in the principles of adult learning, the desire for self-directed learning is dependent upon population, educational experience, degree of learning maturity, learning style, lived experience, and learner-based preferences.[42–44] This suggests that self-directed learning should be viewed on a continuum, with one end being teacher-directed learning, and the opposite end being entirely self-directed learning. The realization that all learners fall somewhere along this continuum posed potential difficulties, given the development of an online program (a method understood to be more self-directed than teacher directed). Recognition of these challenges, however, supported an instructional design that included activities that might be construed as less self-directed and more module directed—with the module taking the place of the instructor. Our ongoing consultation with medical school and medical staff colleagues affirmed a finding repeated throughout the literature, suggesting that physicians, in general, desire to select their own learning situations, while their approach to learning is influenced by the specificity of the identified problem.[45–47]

Emphasis on self-directed learning is recommended increasingly in nursing and medical educational programs to foster continuing education during post

graduate clinical practice, to facilitate lifelong learning, and to maintain currency in evidence-based health care.[39, 41, 46–50] While continuing education for nurses has been required for relicensure in California since 1971, and nationally since 1974, the amount of time practicing nurses spend on self-directed learning for professional reasons is small.[42] Attitudes of medical students also vary in terms of the desire to participate in self-directed learning activities.[42, 47] Slotnick noted that learning self-direction for physicians in clinical practice is influenced by the perception of the problem and learning decision stage. [47] Engaging in self-directed learning often is linked to the content expertise of the supervising educator/ mentor, the educator's knowledge of how people learn, and the experiences learners have had in prior learning situations.[50–53]

When stakeholders in the University of California system advised that a CVC Removal Module for house staff and clinicians would need to be limited to 30 minutes of active learning time to achieve the goal of "institutionalizing" the critical patient safety content, the operational definition of "short in duration" was made clear. Given the time constraints, facilitation of self-direction was a priority. Knowledge such as how people learn, how content needs to be prepared and delivered for self-directed learning, the immediacy and scope of the VAD safety problem, and the acceptable duration for CME/CEU courses was taken into consideration throughout the instructional design and production process. The modules were designed to engage learners in a didactic dialogue that encouraged them to consider the application of the key concepts in their own practice role and setting. In addition, each VAD core module has a prelearning knowledge self-assessment inventory and a posttest reflecting these same principles. Finally, activities and references were provided to stimulate further independent learning related to VAD safety, upon completion of the focused module.

Learning style/learning preferences

Audience characteristics and preferences are not the only learner attributes to warrant consideration; individual learning styles also must be addressed in a well-developed program. Learning style is defined as an interconnection of cognitive, affective, and physiological characteristics that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment.[54]

Although each learner perceives, interacts with, and responds to the learning environment in his or her own unique way, it has been suggested that a common learning style may exist among members of the same discipline/profession.[54, 55] On the other hand, research findings related to learning style similarities in professions have been mixed.[40, 41, 44, 46, 47, 49, 53, 56] Two common factors cited in multiple studies related to learning styles contend that (1) multiple learning styles should be addressed within any given learning event, and (2) individual learners benefit from knowing the differences between their own learning style and those of others.

Multiple learning style inventories have been used in the literature to discuss learning styles. Kolb's Learning Style Inventory (LSI)[55, 56] has been recognized as

being psychometrically reliable and was used most frequently to evaluate medicine and nursing learning styles. Given these two factors, learning style categories from the LSI were chosen for use in the VAD module development.

Kolb identified four basic learning styles: convergent, divergent, assimilative, and accommodative. To address diversity of learning attributes, the VAD Safety courseware used various content-delivery strategies. The converger thinks abstractly and desires to actively experiment. An activity using a patient scenario for clinical problem-solving would stimulate active experimentation using procedural simulations that can be applied in the practice setting. Case studies or examples that parallel clinical application or intervention appeal to abstract thinkers and active experimenters. The diverger (opposite of the converger) seeks concrete experiences (e.g., field work, direct observation, or issue-specific media files), and prefers reflective observation, (e.g., via diaries, logs, or brainstorming discussion groups). Using a case example to stimulate a peer discussion of the positives and negatives of potential treatments or procedures would engage the diverger. The assimilator enjoys learning through abstract conceptualization and reflective observation, and likes to develop logical and precise theoretical models. An assignment observing multiple methods for performing the same procedure, as a means of developing a general model using the best of all the application versions, would be effective for the assimilator. The accommodator implements plans and adapts to new situations using a combination of concrete experience and active experimentation, rather than theoretical learning. The use of trial and error techniques in problem solving is characteristic of the accommodator.[41, 55, 56]

Results

Alignment of online curriculum with learner attributes

In developing the derivative, clinician-focused versions of the VAD Patient Safety Core Course, the VAD Project Team responded to clinician demands for continuing education courseware designed to reduce air embolism threats to patients from improper VAD removal. During courseware development, attention was given to diverse learning styles, self-directedness, learning preferences and continuing education requirements for license renewal both in medicine and nursing.

The table below presents a summary of the course components and links to evidence-based practice and learner attributes. Although the VAD Interdisciplinary Education team has incorporated multiple content delivery methods aimed at diverse learning styles, participant feedback remains vital since each course/module potentially serves learners with different learning styles. Additional evaluation, now in progress, will guide future methods for delivering course materials.

Table 1. Course material presentation representing elements of evidence-based practice and learning styles

	Learner Elements : Kolb learning style emphasized
Converger (AC-AE)	Course Component Possibilities: • Clinical example, practical skill application • Independent work • Multiple choice self-assessment test • Specialty focus; single clinical problem with potentially negative outcome
	Learning objectives part of each learning component
Assimilator (AC-RO)	Course Component Possibilities: • Media files of correct and incorrect procedures • CEU is independent work • Procedure based on logically sound and precise methods • Assignment to compare and contrast media files (correct and incorrect) and determine incorrect procedures in video
Diverger (CE-RO)	Course Component Possibilities: • Recognize problems: clinical examples of incorrect procedure, assignment = recognize • Like group work; encourage formation of small groups and live chat; site will have chat room groups can use • Observation of clinical components facilitate procedure adaptation • Reflective learners (RO) most likely to like online learning
Accommodator (CE-AE)	Course Component Possibilities: • Assignment to take info and go into clinical and apply for themselves • CEU format is independent learning activity, but encourage group formation and support chat room • Application answers provided to the patient safety problem • Information is provided via “mentor” program
	Evidence-based/practice-based elements
Formal scientific investigation	Course Component Possibilities: • Application based on evidence and outcomes • Expert (application and theoretical) content development • Based on HRSA/AHRQ grant #1 D51 HP 1000401
Literature review	Course Component Possibilities • Current literature links and Web sites • CDC guidelines
Reproducible recordable unbiased clinical experience	Course Component Possibilities: • Actual clinical media footage • Actual patient footage – only teaching not actual patient • Multiple providers doing same procedure
Technology applications	Course Component Possibilities: • Computer-based instruction • Current online information that has been assessed for quality and appropriateness

Table 1. Course material presentation representing elements of evidence-based practice and learning styles, cont.

Team performance	Course Component Possibilities: • CEU Web site will allow multiple entrances during learning if group/team discussions are of interest • Collaborative practice
Authority sharing Non-punitive critique	Course Component Possibilities: • Modeled—Incorrect examples filmed for problem solving without blame or recrimination
Conflict resolution	Course Component Possibilities: • Data presented in problem solving format–resolution of
New learning experiences for practice improvement	Course Component Possibilities: • Online CEU program modeled on learning styles and evidence-based practice

AC = Abstract conceptualization
AE = Active experimentation
CE = Concrete experience
RO = Reflective observation

Conclusion

It may be suggested, in hindsight, that a thorough assessment of potential learners and their expectations for the VAD patient safety courseware might have altered the scope of the initial core course offering. The development of the core course established an academic foundation for subsequent course offerings, however, and defined the range of VAD patient-related topics of interest to practicing clinicians. It is hoped that the core course will continue to function as a comprehensive VAD patient safety curriculum for educators, administrators, and practitioners of divergent backgrounds and professional interests, while serving as a repository of knowledge from which more clinically focused and targeted alternative course offerings are derived. Synthesizing, packaging, and using technology to expedite the transfer of evidence-based knowledge to clinical practice and VAD-related improvements in patient care quality, safety, and outcomes has been the aim of the UCSF VAD Interdisciplinary Education Project. The instructional development process has been iterative and the institutionalization of select versions of the content will sustain the impact of the educational intervention on clinician competencies. We look forward to tracing and understanding those impacts over time.

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